



Get the best colours from digital photos

If you've got a set of murky-looking photos on your PC, don't delete them. Ben Pitt shows you how to add a splash of colour

Digital cameras are pretty good at working out how bright a photo should be. Point their lenses at a scene and they'll measure the brightness and adjust the shutter speed, aperture and ISO speed to produce a pleasing photo, all in a fraction of a second. However, few photos are 100 per cent perfect. Cameras tend to measure the average amount of light across a scene, but this measurement may be skewed by a direct light source, such as a light bulb or the sun appearing in the scene, a strong backlight or lots of dark or light colours in the subject matter.

Another common problem involves dynamic range, which is the difference in brightness from the darkest to the brightest part of a scene. A photo taken indoors looking through a window on a sunlit day will have a very wide dynamic range, as the darkest corners of the indoor area will be much darker than the sunlit, outdoor parts. Cameras aren't sensitive enough to measure both extremities at once, so anything above a certain brightness is recorded as pure white, while the darkest areas below a certain threshold are lost in the image noise. This is known as highlight and shadow clipping.

It's equally common for photos to suffer the opposite problem. If a scene has a narrow dynamic range – where nothing is particularly bright or dark – the recorded colours are bunched up together in the middle of the camera's colour spectrum. This is common when shooting landscapes, particularly in overcast or wet weather. The photos may be faithful to the original view, but they're not exciting to look at.

TUNING UP

All these problems can be cured, or at least mitigated, with image-editing software. We've used Photoshop Elements 6 – a trial version of which is on the cover DVD – but the tips also work in version 5, and similar tools are available in other image-editing applications. Before you start, check the monitor you'll be working on is set up to show colours as accurately as possible.

Various tweaks are possible using the monitor's onscreen display (OSD), but if your graphics card and monitor are connected digitally, either with a DVI cable or if you're using a notebook, these options will be more limited. Either way, the chances are you'll have a brightness control and possibly a contrast control, too. These are usually set to make games, DVD and photos look attractive, but it's important to ensure that your settings aren't causing clipping of the shadows and highlights (in the same way that a camera does when shooting a high-dynamic range scene). Professionals use hardware colour calibrators, but you can do a reasonable job for free using the colour calibration guide in *Computer Workshop*, *Shopper* 243, which is on this month's cover disc.

Once you have confidence in what your monitor is showing you, the best way to judge the colours in a photo is to look

at it. A Histogram display can help, too. This shows the colours that appear in an image as a graph ranging from black to white – the more pixels with a particular brightness, the larger the bump on the graph.

The Histogram display isn't shown by default, so activate it in Photoshop Elements' Window menu and dock it in the Palette Bin by dragging the tab at the top of the palette into the Bin. Open some photos and see how the histogram reacts. Dark photos will tend to be bunched up towards the left of the display, and bright photos to the right. Photos with clipped shadows will show a peak at the far left, with clipped highlights appearing as a peak at the far right. Photos with a small dynamic range will have values bunched up in the middle of the graph.

As a general rule, photos look best when there's a range of colours from black to white, stopping just short of clipping at either end. There are exceptions, such as when a bright sky is clipped so the foreground subject is nicely exposed, or in an atmospheric picture with lots of dark areas. However, it's often worth experimenting to see if a more balanced range of brightness levels gives better results.

MAKING ADJUSTMENTS

The first tool to try is Auto Contrast, which you'll find in the Enhance menu. This simply stretches the dynamic range of photos so that colours vary from pure black to pure white; it won't have any effect if they already do. This often provides an instant fix for badly exposed photos and gives an increased sense of depth to images with a small dynamic range. However, chances are you can achieve better results with the manual controls.

Photoshop Elements' Brightness/Contrast tool (which is located in Enhance, Adjust Lighting) is more sophisticated than similar tools in competing software. In Paint Shop Pro, for example, the Brightness slider is a simple additive process – increase the brightness and

INTRODUCTION

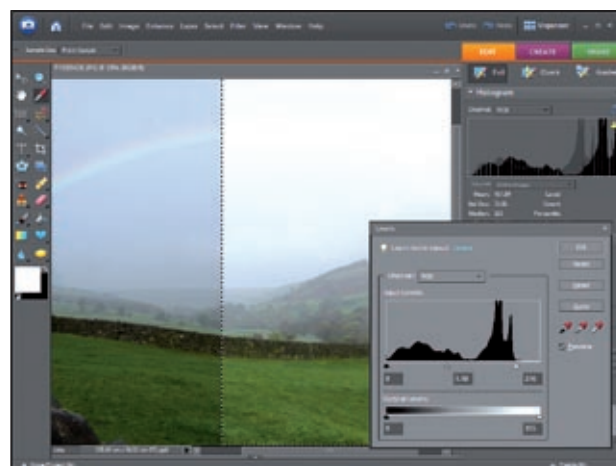
You don't need to settle for dull, murky colours in your photos. Chances are there's a beautifully exposed picture waiting to be unleashed from even the gloomiest shot, and well-exposed photos can often be improved even further with a few choice tweaks.

In the first instalment of our new monthly column to help you get more from your photos and video productions, we look at the Histogram tool and how it can help you to make intelligent decisions to improve your photos.

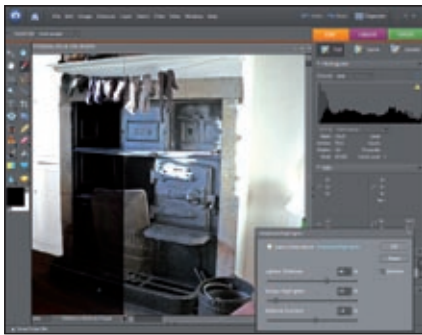
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▲ The original photo (left) looks dull, with no colours in the brightest part of the histogram. We brightened it up (right) with the Levels tool by adjusting the Highlight and Midtone points



▲ The Shadows/Highlights tool brightens up the shadows without affecting the highlights, and darkens the highlights without affecting shadows



▲ Adjust Color Curves includes a graph that plots input colours (horizontal axis) against output colours (vertical axis)



▲ We've brightened up this photo in three sections using (from left) Shadows/Highlight, Brightness/Contrast and Levels

the Histogram curve stays the same shape but moves to the right. This may be what is required, but it also runs the risk of causing clipping.

Photoshop Elements' Brightness control has a more complex effect, causing luminosities to bunch up toward the brighter or darker end of the histogram. It's like taking a spring that's tethered at both ends and pulling the middle towards one end. As a result, Photoshop Elements' Brightness control won't cause clipping.

The Contrast slider compresses or expands the dynamic range, and once again it's tethered at either end of the Histogram, so it won't cause clipping when the contrast is boosted, nor will it dull pure black and pure white colours when the contrast is reduced. If this all seems too technical, try out some extreme settings to see how it behaves in action.

The Levels tool, located alongside Brightness/Contrast in the same menu, has two sets of controls. The upper half, labelled Input Levels, has its own histogram display, below which are three arrows. The left and right arrows define what black and white should be. Dragging them towards the centre will increase the contrast, but may also cause clipping. However, if the Histogram shows that there are no very dark or very light parts of the photo, moving these arrows to where the Histogram first rises up is an effective way to stretch the colours to use the whole available spectrum. This is particularly useful for fixing photos with a narrow dynamic range, boosting their contrast while being careful to avoid clipping.

The middle of the three arrows defines where the midpoint of the histogram should be. Adjusting it brightens or darkens the midtones

without affecting the black and white points. The effect is very similar to Photoshop Elements' Brightness control, but the results tend to be smoother and subtler. The other part of the Levels tool, labelled Output Levels, limits the range of output colours, but this isn't much use for corrective photo editing and is more suited to graphic design tasks.

Sadly, Photoshop Elements users miss out on the full version of Photoshop's Curves tool. Adjust Color Curves is a simplified version, available from Enhance, Adjust Color, Adjust Color Curves (in Photoshop Elements 5, you need to click on the arrow next to Advanced options). This has three controls for adjusting the brightness of highlights, midtones and shadows, plus a Midtone contrast control. The software displays settings as a graph of input colours plotted against output colours, which reveals how adjusting one setting can have an effect on the others. For example, moving the Adjust Shadows slider will also have an impact on the midtones. In general, the smoother the curve, the more natural-looking the results will be. It's also advisable to avoid letting the curve become horizontal at any point, as this will reduce contrast and create unsightly blocks of grey.

Curves, and even the simplified Adjust Color Curves, can be tricky to get good results from, but Photoshop Elements includes another variation in the form of Shadows/Highlights. This is particularly useful for photos with a wide dynamic range. Although it can't regenerate parts of the image lost due to clipping, it can salvage tones that are bunched up in the shadows and highlights, and spread them more evenly across the colour spectrum. A Midtone

contrast control helps to restore contrast if the resulting photo starts to look flat.

RETURNING TO THE CAMERA

There isn't a cure for photos that suffer from clipped highlights and shadows, as once these colours are lost there's no way to recover them. However, when you're taking photos in lighting conditions with a wide dynamic range, there's a trick you can try to reduce the likelihood of clipping and produce the best possible photos.

Clipped highlights are often more noticeable than clipped shadows. If you think highlights are being clipped, either from your camera's built-in Histogram display or by examining the preview image, try adjusting the exposure compensation on your camera to -1 EV. This may result in an underexposed photo, but you can compensate for this in your image-editing software. Try raising the brightness of the shadows using the Shadows/Highlights tool, or raise the brightness of the entire photo using Brightness/Contrast or midtone adjust in the Levels tool.

These techniques should produce a well-exposed photo while minimising highlight clipping. However, shadows will be noisier, so it's not a technique that works every time. As such, it's worth taking a normally exposed shot at the same time, so you have a choice. **ES**

Next month

EMULATING FILM EFFECTS

Find out how to make your films more visually exciting without looking gimmicky

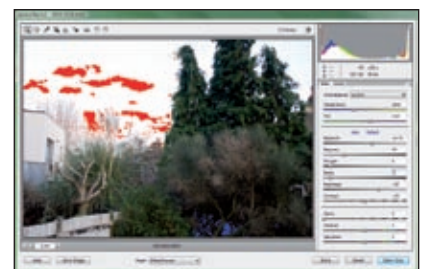
Raw power Using your camera's advanced file format

Digital SLR cameras and advanced compact and ultra-zoom models include a Raw shooting mode, which captures images without any lossy compression and, usually, without any digital processing of the image. As such, they give direct access to the image captured by the camera's sensor.

Raw image files are larger than JPEGs, so they use up more memory card and hard disk space and take longer for the camera to store, but with the right software you can produce better results than are possible by manipulating the camera's JPEG output. The Raw-processing software bundled with most affordable cameras is basic, but Adobe Photoshop Elements includes the highly capable Adobe Camera Raw. This opens when

you try to load a Raw file. Other editors such as Corel Paint Shop Pro can open many types of Raw files directly.

The advantage of shooting in Raw mode is twofold. Many cameras, particularly those aimed at home users, tend to use quite heavy processing to maximise image quality. However, once you know what you want and how to achieve it, you'll probably be able to do a better job yourself. The other advantage involves JPEG compression. The JPEG format reduces file sizes to around a tenth the original size by discarding image information that the viewer is unlikely to miss. However, once you start manipulating colours, this discarded information often becomes more noticeable. That's why it's better to shoot uncompressed



▲ Adobe Camera Raw tools can adjust the tonal balance of photos shot in Raw mode. The red and blue warns of highlight and shadow clipping

pictures, tweak the colours and then save as a JPEG file, rather than to save as a JPEG, tweak the colours and resave as a JPEG.